Express Mail Label No. EL356348245US

[0001] COPLANAR CAMERA SCANNING SYSTEM

[0002] CROSS-REFERENCE TO RELATED APPLICATIONS

[0003] This application is a continuation of U.S. Application No. 09/810,204, filed March 16, 2001, which claims the benefit of U.S. Provisional Application No. 60/190,273, filed March 17, 2000.

J.P. 10/17/04 Pat. No. 6,628,445

[0004] BACKGROUND

[0005] The present invention relates generally to optical scanning systems. More particularly, this invention relates to a scanning system containing a camera using a coplanar light source.

[0006] Various optical scanning systems have been developed for reading and decoding coded symbologies, identification of objects, comparison of objects, and measurement of objects. Each of these scanning systems utilizes either a non-coherent or coherent light source. Lighting is one of the key elements in obtaining good image quality. The intensity of light needed for scanning is directly proportional to the transport speed of the scanned object and the speed of the sensor. Generally, the faster an image is to be acquired, the more light is needed. Until now, only high intensity sodium or halogen lighting was adequate to obtain crisp images in cameras that focus over a significant depth of field at high speeds. The light source is usually located off axis from the camera and sensor detecting the light reflected from the object being scanned.

[0007] In applications using sodium lamps as a light source, the lamps are used to provide the illumination required by the camera detection means. These lamps provide an abundance of optical power because they are very bright and have a wide spectral range. There are, however, several disadvantages to sodium lamp light sources. First, due to their extreme brightness, sodium lamps can create an annoyance and possible hazard to workers working in the vicinity of the scanning systems. Second, sodium lights require a large